

# Spread of Ovarian Cancer after Laparoscopic Surgery: Report of Eight Cases

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**Objective.** The aim of this study was to describe early occurrences of metastases after laparoscopy of ovarian masses later found to be malignant.

**Methods.** The hospital charts of eight women having undergone laparoscopic surgery for ovarian mass were reviewed and analyzed.

**Results.** The mean age of the patients was 40 years (range 25 to 66). Size of the tumor ranged from 2 to 15 cm. In four patients the ovarian mass was suspected to be malignant in the laparoscopy. Diagnostic procedure (biopsy of the tumor) was performed in two and salpingo-oophorectomy in six patients. Staging laparotomy was performed within the mean of 17 days (range 7–29). In four patients (50%) the cancer had spread from a localized to an advanced stage during the delay. Ascites was present in the laparoscopy in two of the four patients with port site or abdominal wall metastases.

**Conclusions.** Laparoscopic surgery of ovarian mass later found to be malignant can cause considerable and early spread of the cancer. © 1999 Academic Press

**Key Words:** laparoscopic surgery; ovarian cancer; metastases; abdominal wall; port site.

## INTRODUCTION

Laparoscopic management of adnexal masses has enormously increased from the late 1980s. In fact, laparoscopic procedures have replaced the abdominal approach in many clinics. This change in gynecologic practice has led to a situation in which some of the procedures have been performed in cases of uncertainty; adnexal masses expected to be benign are later found to be malignant [1]. Evaluation of adnexal mass, including laparoscopic surgery, is one of the most described topics in the field of gynecologic oncology.

Since the end of the 1970s 5 case reports (including 13 patients) of port site or abdominal wall metastases after laparoscopic surgery of ovarian masses later found to be malignant have been published [2–6]. Three reports (including 4 patients) exist of port site metastases after laparoscopic surgery of borderline ovarian tumors [5, 7, 8]. Indeed, the recent review of Wang *et al.* [9] listed 38 reports including 69 patients with port site metastases after laparoscopic surgery of other cancers. On

the other hand, Childers *et al.* [10] showed that the frequency of port site metastases after laparoscopy of patients with intraperitoneal or retroperitoneal carcinoma was only 1%. Even though port site or abdominal wall metastases are rare, they are associated with poorer survival [6].

We present eight women with early occurrence of metastases after laparoscopy of an ovarian mass later found to be malignant.

## MATERIALS AND METHODS

Between October 1993 and September 1998 eight patients having undergone laparoscopic surgery of an adnexal mass later found to be epithelial ovarian cancer and treated in the Gynecologic Oncology Department of Obstetrics and Gynecology of Helsinki University Central Hospital were found, reviewed, and analyzed. Four of the laparoscopic procedures (patients 4 and 6–8) were performed in gynecologic departments of surrounding district hospitals. These patients were sent to our clinic for further treatment after the cancer diagnosis was confirmed. The remaining four laparoscopic procedures (patients 1–3 and 5) were performed in our hospital, but none in the oncologic department. The laparoscopy included inspection of the upper abdomen, the diaphragm, the omentum, and the pelvis in all cases and washings of the abdominal cavity in four cases. Data of preoperative status and examinations, surgical procedures, histologic findings, and patient outcome were recorded.

## RESULTS

The mean age of the patients was 40 years (range 25 to 66). Characteristics of the patients with primary localized (FIGO stage IA–IC) tumor are summarized in Table 1 and those of primary advanced tumor with occurrence of abdominal wall metastases in Table 2. One of the tumors was left-sided, four were right-sided, and three were bilateral. In patient 1, who wished to reserve her fertility, a borderline tumor on both ovaries had been diagnosed earlier; the ovaries had been laparoscopically biopsied 12 and 7 months previously with no signs of malignancy.

**TABLE 1**  
**Characteristics of Patients with Primary Localized Tumor**

Case	Age (years)	Laparoscopic procedure	Diameter of tumor (cm)	Ascites	Gross <sup>a</sup> disease	FIGO stage <sup>a</sup> at laparoscopy	Delay (days)	FIGO stage at laparotomy	Follow-up status (months)
1	25	USO	2	Absent	Present	IC	21	Serous, IIIA G1	NED (60)
2	39	USO	7	Absent	Absent	IC	16	Serous, IIIC G3	NED (47)
3	32	USO	3	Absent	Present	IC	21	Serous, IIIB G1	DOD (58)
4	47	USO	15	Absent	Absent	IC	22	Mesoneph, IIIA G2	NED (36)
5	35	USO	6	Absent	Absent	IA	14	Serous, IV G2 <sup>b</sup>	NED (22)
6	66	BSO	5	Absent	Absent	IC	29	Serous, IV G2 <sup>b</sup>	NED (6)

Note. USO, unilateral salpingo-oophorectomy; BSO, bilateral salpingo-oophorectomy; NED, no evidence of disease; DOD, dead of disease.

<sup>a</sup> Macroscopic.

<sup>b</sup> Port site metastasis.

Preoperative CA-125 levels were elevated ( $>35$  IU/L) in two of seven patients examined (in patient 7 the determination was performed postoperatively). In patient 4 the value (45 IU/L) was considered to be "within normal limits," and in patient 6 the elevated value (217 IU/L) was thought to be associated with suspected sactosalpinx (ultrasound diagnosis). Ultrasound examinations of ovarian masses were suspicious for ovarian cancer in four patients (cases 2, 3, 5, and 7); the other masses were considered to be benign.

Four ovarian masses were regarded macroscopically malignant (gross disease) in the laparoscopy (Tables 1 and 2). The stage IC cases were as follows: in patient 1 the ovarian tumor was fixed to the pelvic peritoneum and was ruptured during the liberation procedure; in patient 4 the ovarian tumor was so large that it had to be cut up; in patients 2 and 6 the tumors were ruptured within a plastic pouch; and in patient 3 the tumor (confirmed to be cancer in the frozen-section analysis) had grown through the ovarian capsule. In patient 6 intra-abdominal dissemination of the tumor (borderline tumor in the frozen-section analysis) and in patient 7 peritoneal carcinosis and metastasis in the navel were found in the laparoscopy. The mean delay from laparoscopic surgery to staging laparotomy was 17 days (range 7–29).

Laparotomy for patients, except patient 7 (explorative procedure), included bilateral salpingo-oophorectomy, omentectomy, pelvic and para-aortic lymphadenectomy, and peritoneal

samplings. Remarkable intra-abdominal spread of the cancer (from stage IC to IIIA–C) was found in four patients (Table 1). Two port site metastases and two abdominal wall metastases were found. Size of the port site metastases was under 1 cm in patient 5 and 2 cm in patient 6. The abdominal metastases ( $5 \times 5$  cm in patient 7 and  $5 \times 8$  cm in patient 8) were located beneath the left port site and were detected in laparotomy performed 8 and 7 days after the laparoscopy. Both abdominal wall metastases were associated with the presence of ascites in the laparoscopy.

The histologic specimens obtained in the laparotomy confirmed that all tumors represented advanced stages (IIIA–IV). All patients were treated with chemotherapy consisting of cisplatin with cyclophosphamide or paclitaxel in 3- to 4-week courses beginning on the 9th–15th postoperative day. The mean follow-up time was 32.7 months (range 6–60). The follow-up status of patients is stated in Tables 1 and 2.

## DISCUSSION

Our study shows that laparoscopic surgery can lead to considerable spread of ovarian cancer. Spread of the cancer was most noticeable in two patients with ascites and advanced stage in whom large abdominal wall metastases developed very quickly. The early occurrence of metastases in patients with ascites is reported by Gleeson *et al.* [5] and confirmed by Wang

**TABLE 2**  
**Characteristics of Patients with Primary Advanced Tumor and Occurrence of Abdominal Wall Metastases**

Case	Age (years)	Laparoscopic procedure	Diameter of tumor (cm)	Ascites	Gross <sup>a</sup> disease	FIGO stage <sup>a</sup> at laparoscopy	Delay (days)	FIGO stage at laparotomy	Follow-up status (months)
7	39	Biopsy	7	Present	Present	III	8	Mucinous, IV G1	NED (20)
8	35	Biopsy	10	Present	Present	IV	7	Serous, IV	PD (13)

Note. NED, no evidence of disease; PD, persistent disease.

<sup>a</sup> Macroscopic.

*et al.* [9]. In most of our patients the cancer spread occurred during the quite short delay (mean 17 days). Long delay seems to be the rule; in two surveys the mean delay ranged from 4.8 weeks to 6.5 weeks [1, 11]. The delay should be as short as possible, since Lehner *et al.* [12] have shown that if the delay is longer than 17 days, the risk of advanced stages increases markedly: OR was 9.2 for patients who underwent late laparotomy compared to patients with immediate laparotomy.

We acknowledge that the primary laparoscopic staging has been deficient and that, to some extent, our cases can be caused by inappropriate management: Patients with primary advanced tumors were primarily laparoscoped in surrounding district hospitals. This "mismanagement" could have been prevented by centralizing all suspicious tumor masses to be treated in University Hospital. Unfortunately, this is not the fact in our university district and, we believe, not in many others all around the world! Despite preoperative suspicion of malignancy, despite malignant appearance of the ovarian tumor, and despite frozen-section analysis, immediate conversion to laparotomy was not, or could not, be performed. However, these harmful consequences of laparoscopic surgery are becoming more frequent, since there is an increased requirement for minimal invasive surgery by the patients and, on the other hand, by the gynecologists themselves. Anyhow, during our 30-year experience in gynecologic oncology we have never seen such a rapid spread or abdominal wall metastasis of ovarian cancer after laparotomy as is now seen after laparoscopy.

The possible causes for cancer spread after laparoscopy have been recently discussed by several authors [9, 13–16]: Laparoscopic management of ovarian masses can cause spillage of tumor cells and even rupture of the tumor. Spilled tumor cells drift to the trocar sites by contaminated instruments and pneumoperitoneum. Direct contact of the tumor to trocar canals and the presence of ascites increase the possibility of tumor spread [6, 16]. Indeed, surgical trauma and even ischemia of the port sites increases the risk of implantation; evidence exists that implantation of tumor cells is more likely to traumatized than to healthy tissues [17]. Carbon dioxide and smoke originating from electrocautery of tissues contain tumor cells which can implant to trocar sites when pressing out through narrow canals, the so-called "chimney effect" [18, 19]. The rapid spread of cancer to peritoneal surfaces has been explained by the existence of carbon dioxide pneumoperitoneum: pressure and acidosis have caused rapid damage of peritoneal mesothelium leaving the basement membrane vulnerable to "attack" by tumor cells [20].

The use of atraumatic techniques can reduce the risk of cancer spread somewhat, but cannot thoroughly eliminate it [9, 14, 15]. Anyhow, laparoscopic surgery of ovarian masses should follow certain principles, mainly presented by Wang *et al.* [9]. (1) Use of irrigation fluid during the operation should be abundant. (2) In any kind of suspicion of malignancy, palliative procedures should be avoided. (3) Removal of the tumor

should be performed within a plastic pouch and, if required, rupturing and emptying of ovarian cysts should happen within the pouch. (4) Trocars through which the masses are to be removed should be large enough (preferably 12 mm) and, if needed, the incisions should be enlarged. (5) Frozen sections should be used in any suspicious cases and, if the tumor is malignant, laparotomy should be performed at the same time or within 2 weeks. (6) If the tumor proves to be malignant, adjuvant chemotherapy should be given as soon as possible.

The opinion that adnexal masses excepted to be benign should be treated laparoscopically has been generally accepted. Therefore the number of laparoscopic procedures has increased exponentially. At the same time, risk of early metastases of ovarian cancer after laparoscopy has been recognized. This fact argues for careful preoperative evaluation of ovarian masses and rigorous patient selection. In the case of suspected ovarian malignancy, especially with concomitant ascites, laparoscopy should be avoided. With even a minor suspicion of malignancy, the laparoscopy should be performed in a setting in which accurate frozen-section analysis is available and immediate laparotomy performed by a surgically experienced gynecologic oncologist is possible.

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